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SAFETY ELEMENT

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SAFETY ELEMENT

¹
Orange Co.

² ENVIRONMENTAL MANAGEMENT AGENCY ,

February, 1975

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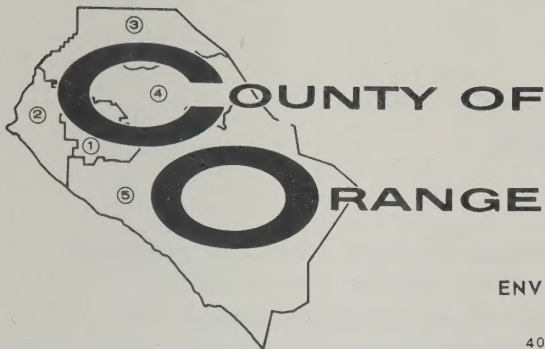
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ENVIRONMENTAL MANAGEMENT
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H. G. OSBORNE
DIRECTOR

FILE

February 13, 1975

Orange County Planning Commission
400 Civic Center Drive West, Room 115
Santa Ana, California 92701

SUBJECT: Adoption of the Safety Element to the Orange County General Plan

SYNOPSIS: The Safety Element is a mandatory element required by state law. Relevant hazards have been identified, mapped and analyzed. Appropriate public hearings have been held. Approval of the element and implementing actions is recommended.

Gentlemen:

The Safety Element was developed by a task force formed in February, 1974. Members included representatives of the Building and Safety, Road, Sheriff, Health, Communications, Emergency Services, Fire and Planning Departments, the Flood Control and Harbors, Beaches and Parks Districts and the Utilities Commission.

The objectives of the task force were to:

1. Satisfy state law by preparation of the element,
2. Prepare a supporting technical document and,
3. Suggest a method of implementation which would, when implemented, improve the health and welfare of the residents of Orange County and meet the requirements of the law.

The primary actions of the task force involved delineating the major hazards and their location in Orange County (seismic/geologic, fire, flood and crime); determining what safety measures are now in operation at the county level and what new ones were needed; and proposing goals and policies to reduce the level of risk in the county.

The findings of the task force have been incorporated in the Technical Report which is summarized in the Safety Element.

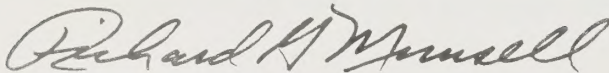
The element proposes an implementation program which would be phased to allow for community feedback and adjustments to the program.

It has been ascertained by the Environmental Services Section that the proposed project cannot, or will not, have a significant effect on the environment. Negative Declaration status was therefore granted and the preparation of an environmental impact report was therefore not necessary.

- RECOMMENDATIONS:
1. That the Planning Commission approve the element and its implementing actions and request adoption by the Board of Supervisors.
 2. Recommend to the Board of Supervisors that:
 - a. The responsibility for implementing the Safety Element shall be with the Environmental Management Agency.
 - b. The Director of the Environmental Management Agency shall be responsible for developing a detailed work program consistent with the phasing indicated in the implementation section of this element.
 - c. Said working program shall be submitted to the Board of Supervisors for consideration on its regular agenda within 60 days of approval of this element.

Respectfully submitted,

ENVIRONMENTAL MANAGEMENT AGENCY



Richard G. Munsell
Assistant Director Planning

HGO:RGM:JC:bd

Enclosure

CONCURRED IN:

H. G. Osborne
Director

ABSTRACT

The Orange County Safety Element is a combination of the Seismic Safety and Safety Elements mandated by California law. It summarizes information contained in a Technical Report prepared in response to the need for detailed background data.

Seismic/geologic, fire, flood and crime hazards are considered.

The Element is countywide in scope and is meant to be a resource document to the cities. It is binding on the unincorporated portions of the county and designed to assist in the coordination of similar efforts by other jurisdictions within Orange County.

A discussion of levels of risk is included, which considers economic and social implications, along with illustrative examples of levels of risk for certain structures.

Current hazards in Orange County are delineated, and goals and policies to mitigate their effects are proposed. The relationship of the Safety Element to other components of the General Plan is reviewed.

A Plan Implementation Program is proposed with recommendations to initiate required actions.

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INTRODUCTION

Orange County contributes more than 1.6 million people of the nine and one-half million who reside in the greater Los Angeles basin. Urban development has expanded into suburbs and encroached into rural and wilderness areas. Natural hazards such as ground instability, tinder dry wildland and occasional inundation are coupled with urban social problems and all too frequent insensitivity to natural ecosystems. These facts emphasize the need and concern for the safety of Orange County inhabitants and their property.

The State mandated general plan elements of Seismic Safety and Safety have been combined into a single Safety Element in the Orange County General Plan. The purpose of this is to develop basic policy positions on urban development to reduce future loss of life, injuries, damage to property, and adverse social and economic impacts.

The Safety Element is countywide in scope and represents the interests of federal, state, and local jurisdictions. It contains an identification of assets, problems, issues and opportunities associated with the safety of the county. It sets forth a basic framework of goals, policies and programs, explains the concept of acceptable risk and suggests an approach to its application in local decision making.

Because of its increasing importance as a public safety concern, the urban hazard of crime has been added to the more generally recognized natural hazards. The four threats to the safety of life and property considered are: (1) geologic (2) fire (3) flood and (4) crime.

A Technical Report has been prepared containing information on these hazards. The report includes analysis of current building codes, development regulations, existing disaster response capabilities and general disaster preparedness. The report is published under separate cover, and

while not a part of the Safety Element of the Orange County General Plan, is the main source of technical information on which the Element is founded. Where relevant, the technical document has been referenced in the Element.

I. OPPORTUNITIES AND ISSUES

In order to evaluate the opportunities and issues involved and to identify those areas (both geographic and jurisdictional) where potential problems exist, the following have been accomplished.

1. Identify current county programs, operations and priorities relative to the four basic hazards: geologic, fire, flood and crime. (See Technical Report, Chapter 7)
2. Identify the areal distribution of hazards.
3. Identify significant problems and issues.
4. Postulate goals and policies that will mitigate identified hazards and improve the general safety of the residents of Orange County.

The relative newness and low density form of Orange County's urban area are definite assets when evaluated in terms of overall safety and susceptibility to hazards. Intensification trends will concentrate populations but will also permit larger open areas and intervening corridors, providing positive conditions that are absent in many of the older urban areas throughout southern California.

Contributing to the reduction of potential disaster impacts is the existence of high quality response agencies and facilities throughout the county. Additionally, agreements of mutual aid combine the capabilities of the county disaster response groups with many other jurisdictions of neighboring cities and counties to provide adequate response to most foreseeable emergencies. (See Technical Report, Chapter 9)

One of the basic purposes of this Safety Element is to identify hazards within the county and initiate precautions to protect the safety of residents. Hazards may reveal themselves as visual physical phenomena such as an active fault zone

or critical dry brush situations. Or, they may be less tangible in the form of insensitive selection of land use designations, poor phasing of development, physical design, and nonexistent or inadequate growth policies.

The Safety Element attempts to deal with hazards and their policy implications by providing basic information identifying known hazards, establishing a framework for evaluating policy options and developing a program designed to monitor results, create tools and mechanisms for implementation and initiate inquiries into critical areas where appropriate data is lacking.

II. DEFINITION AND ANALYSIS OF RISK

An important method of implementing the Safety Element is through the use of land use ordinances and building codes designed to reduce risk to an acceptable level. This is achieved by balancing the cost of incorporating safety measures in construction with the benefit of protecting citizens and property.

Three levels of risk are defined as follows:

Acceptable Risk: The level of risk below which no specific action by local government is deemed necessary, other than making the risk known.

Unacceptable Risk: Level of risk above which specific action by government is deemed necessary to protect life and property.

Avoidable Risk: Risk not necessary to take because the individual or public goals can be achieved at the same or less total "cost" by other means without taking the risk.

Economics is usually the governing factor when considering acceptable risk. The values and goals of society must be weighed against the costs of achieving desired objectives. Using today's technology, damage due to geologic failure, fire, flooding and crime can be minimized--at a cost.

Levels of risk need to be expressed in terms of what should be achieved and what cost limitations society should impose. Some items, however, should not be governed entirely by economics. The following list illustrates those facilities considered critical, in which safety should be optimized:

1. Nuclear Facilities
2. Larger Dams
3. Electric Power Inter-tie Systems

4. Explosive Manufacturing Plants

Typical facilities considered near-critical, with little or no damage tolerable and not entirely governed by economics are:

1. Smaller dams
2. Hospitals
3. Schools
4. Important utility facilities
5. Fire facilities
6. Police facilities
7. Emergency communication facilities
8. Important transportation facilities

The principal goal is for these structures and facilities to be functional in every respect after an earthquake or other natural disaster such as flooding, as well as urban hazards such as fire.

Other important structures and facilities requiring a relatively high degree of protection for occupants should have little risk of collapse and inundation, fire protective devices and a high degree of security against crime (defensible design and hardware). Examples are:

1. Churches
2. Theaters
3. Large hotels
4. Civic buildings
5. Secondary utility structures
6. Extremely large commercial structures
7. Transportation corridors (bridges, tunnels, etc.)

8. Most utilities

9. Other structures for large groups of people.

The above structures, for example, should be located and designed in anticipation of damage during a major earthquake accompanied by some bodily injury. The structure itself, however, must remain functionable.

A broad range of structures and facilities providing acceptable levels of risk include:

1. Commercial facilities
2. Industrial facilities
3. Small hotels
4. Apartment buildings
5. Single family dwellings

These structures should be located and designed to:

1. Resist minor earthquakes without damage; moderate earthquakes without structural damage; and withstand major earthquakes without total collapse.¹
2. Resist spreading of fire from one structure to another, or to adjoining wildlands; to be located in a manner defensible to adjacent wildlands of a low or moderate hazard zone,² with an adequate water supply and evacuation route available.
3. Resist storms producing gale velocity winds (approx. 50 knots), beach waves generated ³ from very rough seas (sea waves to 20 ft.) or flood flows of low velocity (not in the main current), while sustaining non structural repairable damage.
4. Deter unauthorized entry; utilize architectural design and site planning to optimize the safety of the living environment and

aesthetical values; provide adequate hardware to discourage forceable entry; and be oriented to the local enforcement jurisdiction to be within the established acceptable response time capabilities of the jurisdiction.

III. CURRENT HAZARDS IN ORANGE COUNTY

There are 26 incorporated cities within the geographic boundaries of Orange County. These cities usually carry out their day-to day business with a high degree of independence. When a disaster such as an earthquake, flood, or wildland fire occurs, however, jurisdictional boundaries suddenly have no meaning. The following reflect conditions applicable to all of the county.

The major areas of concern in this Element are: geologic hazards, fire and flood hazards and incidence of crime. A discussion of these hazards is presented in a capsulated form from basic information contained in the Technical Report.

Topographically, the county is characterized by a range of low mountainous terrain to the east and south (the Santa Ana Mountains), with a westerly gradient forming low rolling hills and a broad basin or plain. Bisecting the basin is the Santa Ana River, coursing from the mountains through a fertile valley abundant, in the Pleistocene Era, with game and vegetation.

The mountains course in a southwesterly direction toward the ocean, with the terrain becoming a mix of rolling hills, steep canyons, small hidden valleys and occasional plateaus abruptly ending with steep cliffs and secluded beaches as the mountains reach the sea.

A large part of the current population is located on the former Santa Ana River floodplain. In recent years, however, there has been an expansion into the foothill and canyon areas. Special geologic problems exist in both the older urbanized areas and the undeveloped portion of the county.

A. SEISMIC HAZARD

Orange County is more fortunate than some of its neighbors, for only two fault zones are

GEOLOGIC HAZARDS IN CALIFORNIA TO YEAR 2000

A \$55 BILLION PROBLEM

A 30 YEAR PROJECTION

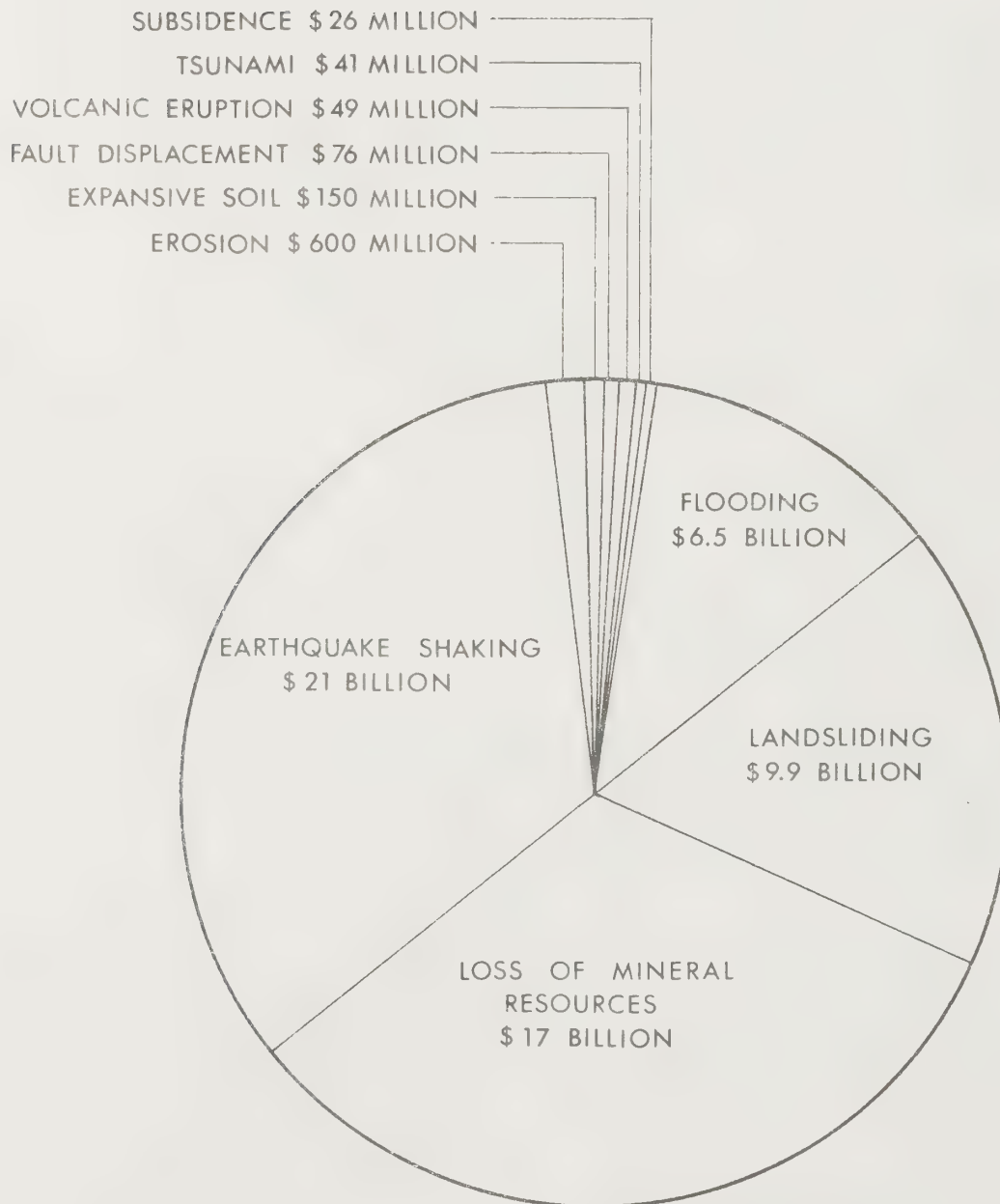


FIGURE 1

(Technical Report, February, 1975)

believed to be potentially hazardous. In the county proper, the best known of the two faults is the Newport-Inglewood Fault, which angles from offshore near Dana Point inland through what is now the City of Newport Beach, on into Los Angeles County through Long Beach and into Torrance.

The Newport-Inglewood Fault Zone is a series of en echelon northwest-trending, vertically-dipping faults extending from the southern edge of the Santa Monica Mountains, southeastward to the offshore area near Newport Beach. This fault zone produced the historic Long Beach earthquake on March 11, 1933, with a magnitude on the Richter scale of 6.3. During the past 50 years, there have been numerous shocks along this zone ranging from 3.0 to 5.0 magnitude. The Newport-Inglewood Fault Zone is believed capable of generating a 7.0+ magnitude earthquake within the next 50-100 years. (See Technical Report, Chapter 12)

Paralleling this fault zone across the northeasterly edge of the County is the Whittier Fault, believed to be the main spur from the larger Elsinore-Chino Fault, which follows a general line easterly of the Santa Ana Mountains into Mexico.

Most recorded shocks in this zone range from 4.0 to 5.0 magnitude, which is considered moderately active. The maximum credible earthquake anticipated from the Whittier-Elsinore Fault Zone is 6.6 magnitude. To place these assumptions in proper perspective, the San Fernando earthquake of February 9, 1971, in Los Angeles County was recorded at 6.4 magnitude.

Most of Orange County lies roughly in the area between these two fault systems.

Faults located outside the county, of course, can cause damage. Depending on their magnitude, earthquakes generated within a fifty-mile radius of a given point are considered noteworthy and could cause minor to moderate damage. For Orange County, these perimeter faults are:

San Andreas, San Jacinto (including Imperial and Superstition Hills), Norwalk, Malibu-coast-Raymond, Palos Verde, San Gabriel and Sierra Madre-Santa Susana-Cucamonga (including "San Fernando") faults.

The earliest recorded earthquake in California occurred in Orange County in 1769. Geologic evidence indicates there were earthquakes here many millions of years before man, however. It is important to note that where earthquakes have occurred before, similar or possibly even larger ones may be expected in the future.

California forms a small segment of the Circum-Pacific belt of seismic activity known as the "Ring of Fire" (see Figure 3). Eight percent of the world's earthquakes originate within this zone, of which one-half to one percent occur in southern California. One reason for this may be that southern California falls within the seismically active belt where the Pacific (oceanic) plate meets the American plate. This zone of plate interaction is the famous San Andreas Fault--the source of many earthquakes in California, including the great quake of 1857 (See Table 1).

Large earthquakes are caused by rupturing of great rock masses under strain within the earth's crust. This usually takes the form of abrupt slipping or sliding along a rupture plane (fault); in other words, each time two segments of the earth's crust suddenly shift past one another along a fault, an earthquake occurs (Figure 4). A classic example of strain accumulation is the San Andreas Fault.

Major earthquakes are commonly accompanied by foreshocks and after shocks which are usually less intense and represent local yielding and adjustments of rock masses along the main zone of faulting. The repeated occurrence of earthquakes along the same fault over many years is not uncommon (See Technical Report, Chapter 2). Judging from ground displacements observed after large quakes, fault slips may reach 50 feet horizontally or vertically. The great majority of shallow earthquakes in southern California

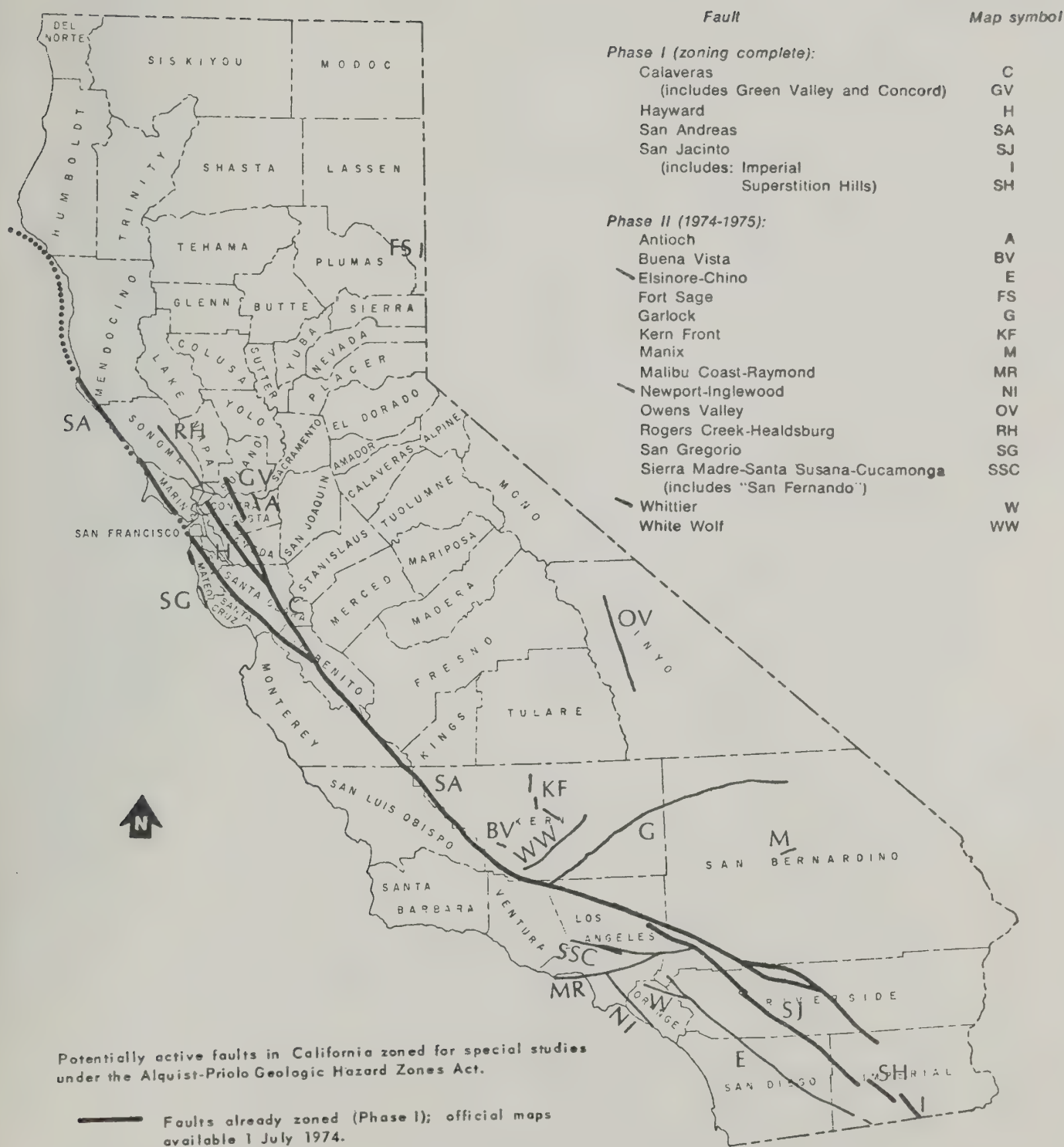
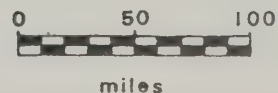
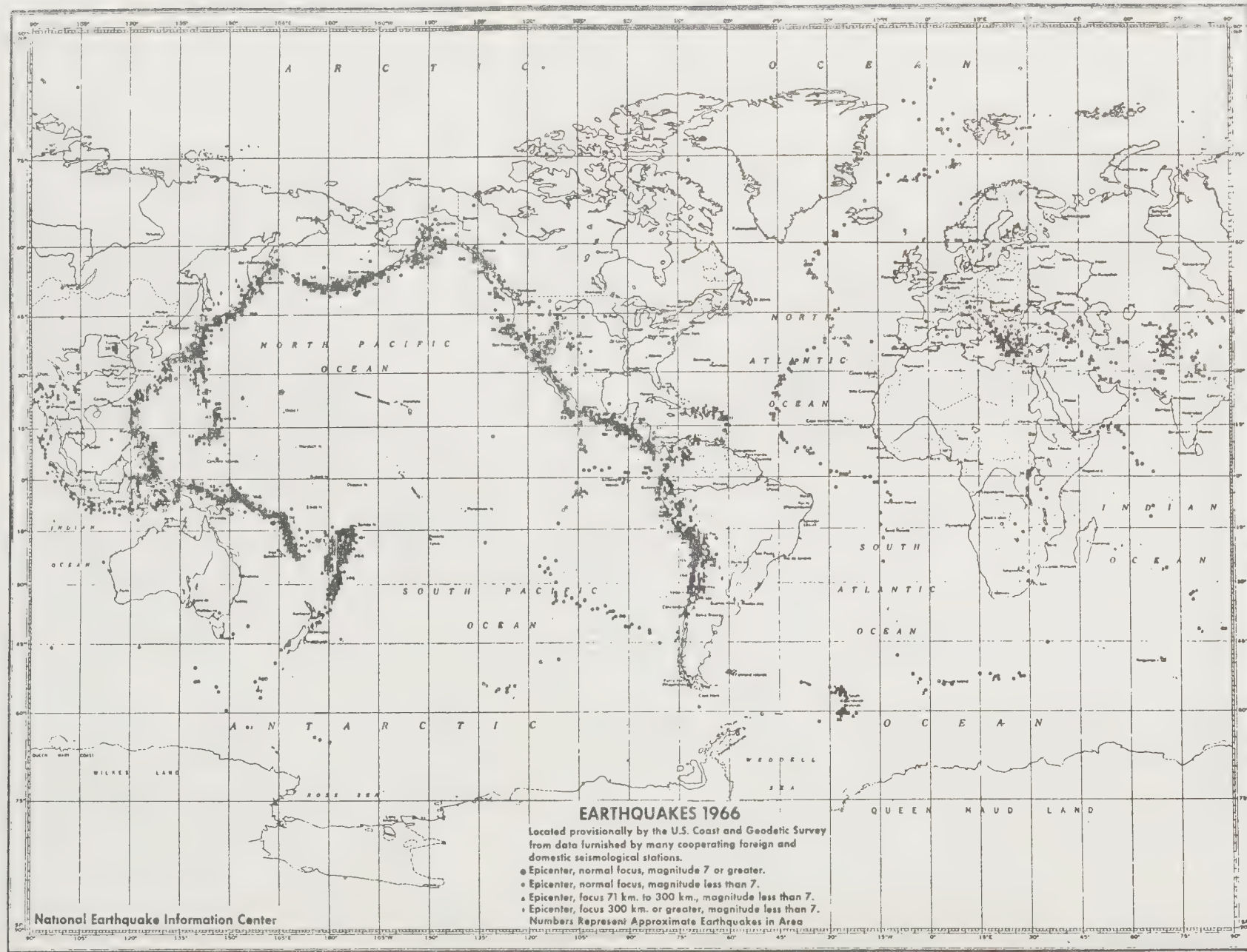


FIGURE 2

NOTE: Other potentially active faults may be zoned in the future and some of the existing zones may be revised when warranted by new fault data.





Map showing global seismicity for the year 1966. The epicenters of the earthquakes were calculated by the U.S. Coast and Geodetic Survey from the observed travel times of seismic *P* waves to seismographic stations. The map can be considered almost complete for earthquakes with magnitude above about 4.

FIGURE 3

TABLE 1
DAMAGE AND DEATHS CAUSED BY STRONG CALIFORNIA EARTHQUAKES

YEAR	LOCALITY	(\$) DAMAGE	DEATHS	MAGNITUDE
1812	San Juan Capistrano	---	28	6.5
1857	Fort Tejon	---	1	8.1
1865	San Francisco	500,000	0	7.0
1868	San. Fran. -Hayward	350,000	30	7.5
1872	Owens Valley	250,000	27	8.4
1892	Vacaville	225,000	--	--
1898	Mare Island	1,400,000	--	--
1899	San Jacinto	---	6	7.0
1902	Los Alamos	---	0	6.3
1906	San Francisco	24,000,000	700	8.2
	due to fire	500,000,000	--	NA
1915	Imperial Valley	900,000	6	6.3
1918	San Jacinto & Hemet	200,000	0	6.8
1925	Santa Barbara	8,000,000	13-20	6.3
1926	Santa Barbara	---	1	--
1932	Humboldt County	---	1	--
1933	Long Beach	40,000,000	120	6.3
1940	Imperial Valley	6,000,000	9	7.1
1941	Santa Barbara	100,000	0	6.0
1941	Torrance-Gardena	1,000,000	0	--
1949	Terminal Island			
	(oil wells)	9,000,000	0	--
1951	Terminal Island			
	(oil wells)	3,000,000	0	--
1952	Kern County	60,000,000	14	7.7
1954	Eureka-Arcata	2,100,000	1	6.6
1955	Oakland	1,000,000	1	--
1955	Terminal Island			
	(oil wells)	3,000,000	0	--
1957	San Francisco	1,000,000	0	5.3
1961	Terminal Island			
	(oil wells)	4,500,000	0	--
1961	Hollister	250,000	0	5.6
1966	Parkfield	50,000	0	5.3
1969	Santa Rosa	7,250,000	0	5.6
1971	San Fernando	511,000,000	58	6.4
1973	Point Hueneme	1,000,000	0	5.5

originate at depths of five to fifteen miles.

Major earthquakes cause violent vibrations to radiate in all directions through rock and overlying soil. It is the accelerations of these vibrations that damage structures (See Technical Report, Chapter 4). Lightweight earth materials (soil and poorly consolidated rock) may experience amplified ground motions 5-, 10-, or 20-fold, increasing in severity with the lightness of the rock or soil and the nearness of the local water table to the surface. This accounts in part for the lack of uniformity in earthquake damage sustained in a community. A major factor, of course, is the sturdiness of individual buildings (See Technical Report, Chapter 12).

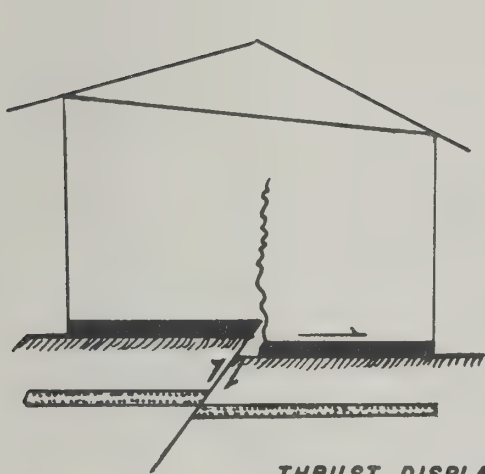
There are three basic earth material-failure mechanisms associated with an earthquake: Shaking, breaking and water damage.

SHAKING is the primary cause of building collapse during an earthquake. The California Division of Mines and Geology estimates that over \$21 billion in damages over the next 30 years will be attributable to shaking alone, if current policies and practices are continued (See Figure 1). The majority of structural failure can be traced to three major effects of earthquake shaking:

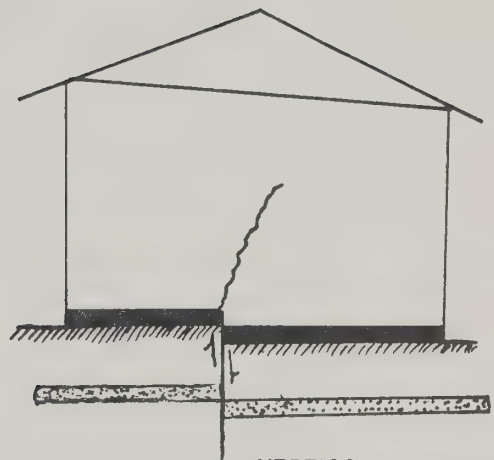
1. Shaking which may cause soil beneath the foundation to densify and settle;
2. Shaking which causes soil failure (Liquefaction) beneath the foundation of a structure;
3. Shaking which damages the structure directly.

BREAKING of the earth's surface is a phenomenon most commonly associated with three different processes:

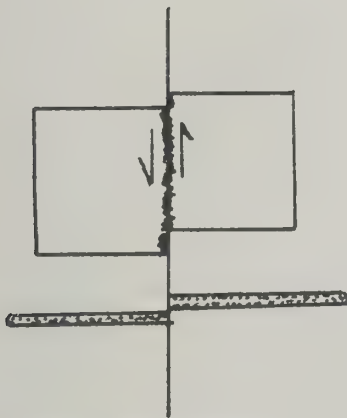
1. Slope failure of unstable soils, activated by shaking, which occasionally induces destructive landslides;



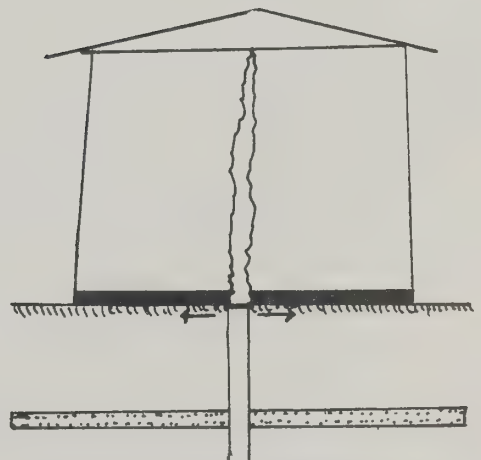
THRUST DISPLACEMENT



VERTICAL DISPLACEMENT

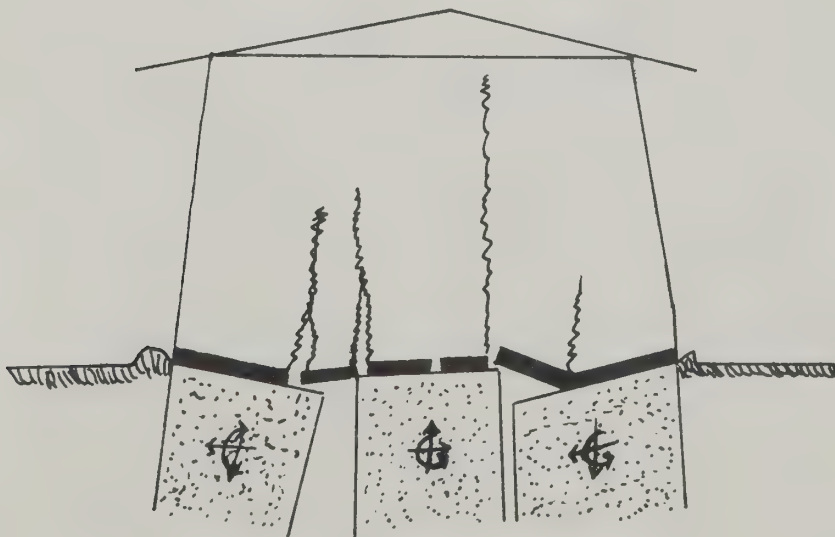


LEFT-LATERAL DISPLACEMENT



EXTENSIONAL DISPLACEMENT

DISPLACEMENTS AND RESULTING DAMAGE



LOCALIZED DIFFERENTIAL DISPLACEMENT

FIGURE 4

2. Lurching, or the rupturing or cracking of soils, in places other than directly along faults, caused by the inability of linear masses of unconsolidated soils to support shaking accelerations;
3. Fault rupture or displacement of two adjacent portions of the earth along a fault, resulting in a devastating effect on structures that straddle the line of displacement (See Technical Report, Chapter 4).

WATER DAMAGE may result from seiches, dam failure, tsunami or linear systems failure. A seiche is the oscillation or sloshing of water in a lake, bay or other enclosed body of water caused by seismic activity or landsliding. This may result in damage to peripheral shore development or to downstream works if water tops a dam.

In some parts of California dam failure may have devastating effects. Orange County's greatest potential damage from dam failure comes from just outside the county, Prado Dam on the Santa Ana River. Irvine Dam poses another threat along Santiago Creek, and while the possibility of its failure is much greater than that of Prado Dam, the resultant damage would be less. (Figure 5) (Additional discussion on flooding is contained in the Technical Report, Chapter 6)

Tsunami, a sea wave generated by a submarine earthquake, landslide or by volcanic activity, is another water damage hazard (See Technical Report, Chapters 4 & 5). Historically, Orange County has not experienced a tsunami of a magnitude exceeding that of high storm tides which periodically threaten our coastal beaches. In order for tsunami to have a major effect on a coastline, it must be generated at almost right angles (perpendicular) to the coastal beach. Orange County's beaches, fortunately, are situated obliquely of any known faults which cause major disturbances. Additionally, offshore islands provide a measure of protection.

Another water damage hazard is linear systems

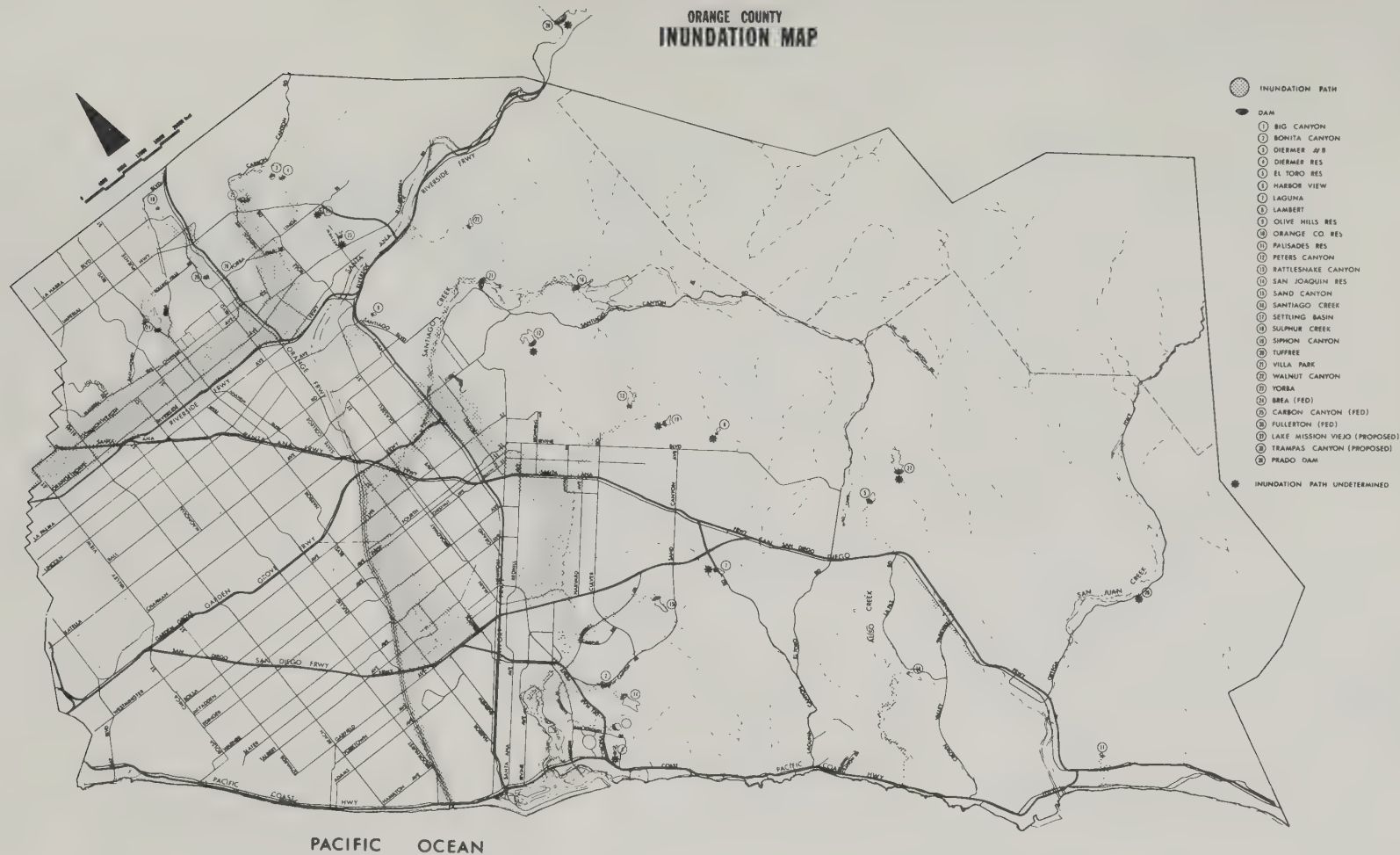


FIGURE 5



failure, usually the most widespread crippling hazard. (See Technical Report, Chapter 13) This condition involves the bursting of water pipes and mains and may affect entire communities. If the failure occurs on main trunk lines, entire regions may be without service.

Other effects resulting from these types of failure include contamination of drinking water and the inability to successfully fight fires which may result from other linear systems ruptures, such as gas and oil lines or electrical transmission lines.

B. NON-SEISMIC GEOLOGIC HAZARD

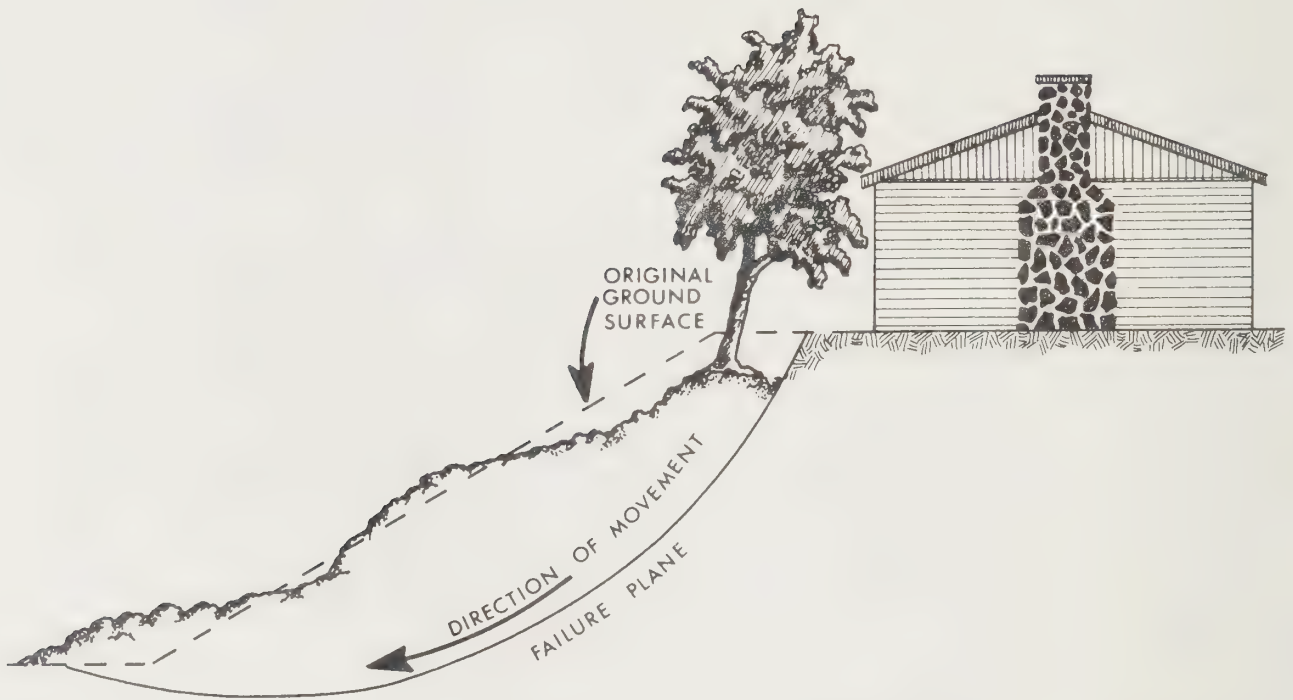
Historically, Orange County residents have been exposed to other geologic hazards not necessarily associated with earthquakes. Such hazards as wildland fires, landslides and mud flows have devastated certain areas in the foothills. The removal of soil stabilizing ground cover, and man's intrusion with machines and structures has added complications to the delicate balance of geologic structures.

These hazards pose serious problems. It is estimated that landsliding will cost the state over \$9.5 billion between 1970 and the year 2000, making it the costliest of the non-seismic geologic hazards.⁴

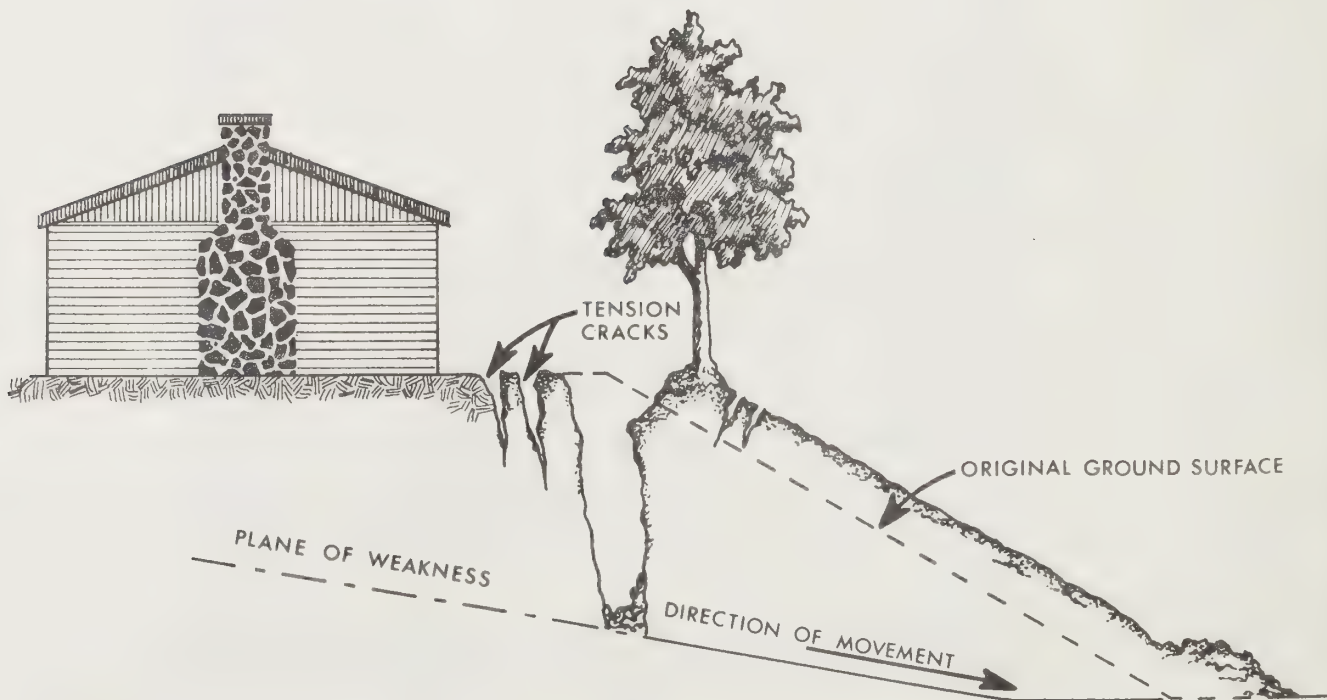
LANDSLIDING results from the movement of slope-forming earth or rock materials downward under the influence of gravity. This may take the form of a flow, slide or fall, or a combination of the three. Many factors affect the severity of a landslide, such as local bedrock and soil conditions, moisture content, vegetation and slope. (See Figures 7 and 8)

Figure 9 is a map depicting large landslides in the county. Explanation of this map is covered in the maps section of the Technical Report.

SUBSIDENCE and UPLIFT (See Technical Report, Chapter 5) are terms usually associated with



ROTATIONAL LANDSLIDE



PLANAR LANDSLIDE

FIGURE 7

LANDSLIDE AND SHAKING SUSCEPTIBILITY MAP



FIGURE 8

conditions which cause vertical mass movements of earth material downward or upward with little or no movement laterally. This condition may cause possible structural damage to buildings, water pipes, storm drains, irrigation ditches, and certain underground utilities. Generally, this condition may be caused by subterranean extraction of water or other liquid or plastic materials from below the surface. In certain arid areas where large amounts of water have been applied for irrigation purposes, settling may occur, which is referred to as hydrocompaction.

EROSION is a process by which earth or rock materials are loosened or dissolved and moved from place to place by the action of water or wind.

Erosion of fields, cliffs and stream channels has been of concern to man for centuries. Beach erosion has damaged or destroyed both functional structures and erosion protection devices. Stream erosion and sedimentation have constituted a major hazard to cities and other man-made facilities located beside or athwart streams or rivers. The seriousness of topsoil loss due to erosion in agricultural areas led to the organization of the Federal Soil Conservation Service, which has provided research and consultation to minimize this loss.

Soil loss and stream erosion are dealt with in the Conservation Element of the Orange County General Plan.

Beach and cliff erosion problems are a major concern in Orange County (See Technical Report, Chapter 5). This process is influenced to the greatest degree by man-made changes and obstructions in the ocean affecting the coastline. Other factors are wind, interference with stream processes, wave height and direction, tides and sand lost to deep ocean basins.

The sand supply is renewed by the sediment load of rivers and streams emptying into the ocean and diminished by storm breakers in winter which tend to remove sand from the beaches, building

up bars offshore. Beaches are widened or narrowed by waves coming in at an angle to the beach. This process, of course, does not occur at a constant rate. The system is influenced by such factors as the damming of rivers which causes deposition of the sediment load from upstream areas into reservoir areas.

The lining of flood control channels prevents water from picking up a sediment load from its sides and bottom. The swifter flows within the channels, however, provide more efficient transport of sediment load picked up above channel entrances, allowing it to be carried to the beach rather than deposited in low gradient sections near the coast. The damming of rivers and streams is a much more important factor in reducing the amount of sediment carried to the ocean than is the lining of flood control channels.

The undesirable erosion of the land surface is the phenomena that furnishes the desirable supply of sand for beaches. Erosion control practices on the land, including the use of sedimentation basins, will reduce the amount of material supplied to the streams.

The discharge of eroded materials into the ocean is regarded as desirable while the same discharge into a bay, estuary or harbor is decidedly undesirable both from environmental and economic points of view.

Land uses and flood protection practices should be regulated to maximize the sediment discharged into the ocean and minimize that carried into harbors and bays, consistent with other needs determined by economic analyses. Among the economic factors considered should be the cost of artificial beach replenishment from other sources of sand.

Land use patterns should be analyzed with respect to beach erosion. Structures placed in areas subject to beach erosion are vulnerable to damage and may themselves interfere with natural beach processes.

Beach cliff erosion is also of concern. Although cliff erosion rates are not well known in this county, sloughing from cliffs has caused problems in the past and, undoubtedly, has made substantial contribution to beach sand supplies. Additional studies of cliff erosion rates and ways to balance sand supply to the beaches are warranted. These studies should be integrated between appropriate county, city, state and federal agencies.

Complete elimination of this problem may not be feasible, but some rational mitigation measures may be found desirable. In the interim, structures subject to beach erosion damage should be required to have appropriate protection devices.

C. FIRE HAZARD

Fire hazards take many forms. Structures in urban areas pose obvious problems. Wildland areas are faced with less obvious, but very serious fire hazards.

The spread of people from urban to more suburban areas can increase wildland hazards and disturb sensitive ecosystems. This is an especially serious problem in Orange County with its large wildland areas and rapid urban expansion. In the Cleveland National Forest alone there are over 66,000 acres of wildland area.

Wildland fires may be caused by hazardous natural brush situations, arson, airplane or automobile crashes and earthquake related fires.

The latter type of fire is often spread by petroleum products and other materials from ruptured pipelines. The fighting of these fires is often hampered by the lack of water from ruptured water lines.

These risks may be reduced through the adoption of area-wide pipeline standards and the upgrading of existing lines to allow for the quick isolation of pipeline ruptures. Mutual

FIRE HAZARD ZONE **ORANGE COUNTY SAFETY ELEMENT**



FIGURE 9

assistance from other agencies is imperative to keep such risks at a minimum.

Four major fire disasters have occurred in Orange County in the last 30 years:

1. The Green River Fire, 1948 - 48,000 acres burned
2. The Steward Fire, 1961 - 66,000 acres burned
3. Leisure World Aircraft Crash, 1967 - losses estimated at \$146,000
4. The Paseo Grande Fire, 1967 - 66,000 acres burned

To prevent such occurrences in the future, mutual aid among governmental agencies should be assured.

D. FLOOD HAZARD

The Orange County Flood Control District is empowered to control flood and storm waters and to conserve water for beneficial use. The District's activities have centered around construction of large regional works, such as dams, basins, open channels and regional storm drains. The cities have been instrumental in providing local storm drains leading into the district's regional works.

The U.S. Corps of Engineers' activities have largely been limited to the construction of Prado, Fullerton, Brea and Carbon Canyon dams. The Corps is now restudying its county program and may undertake further work.

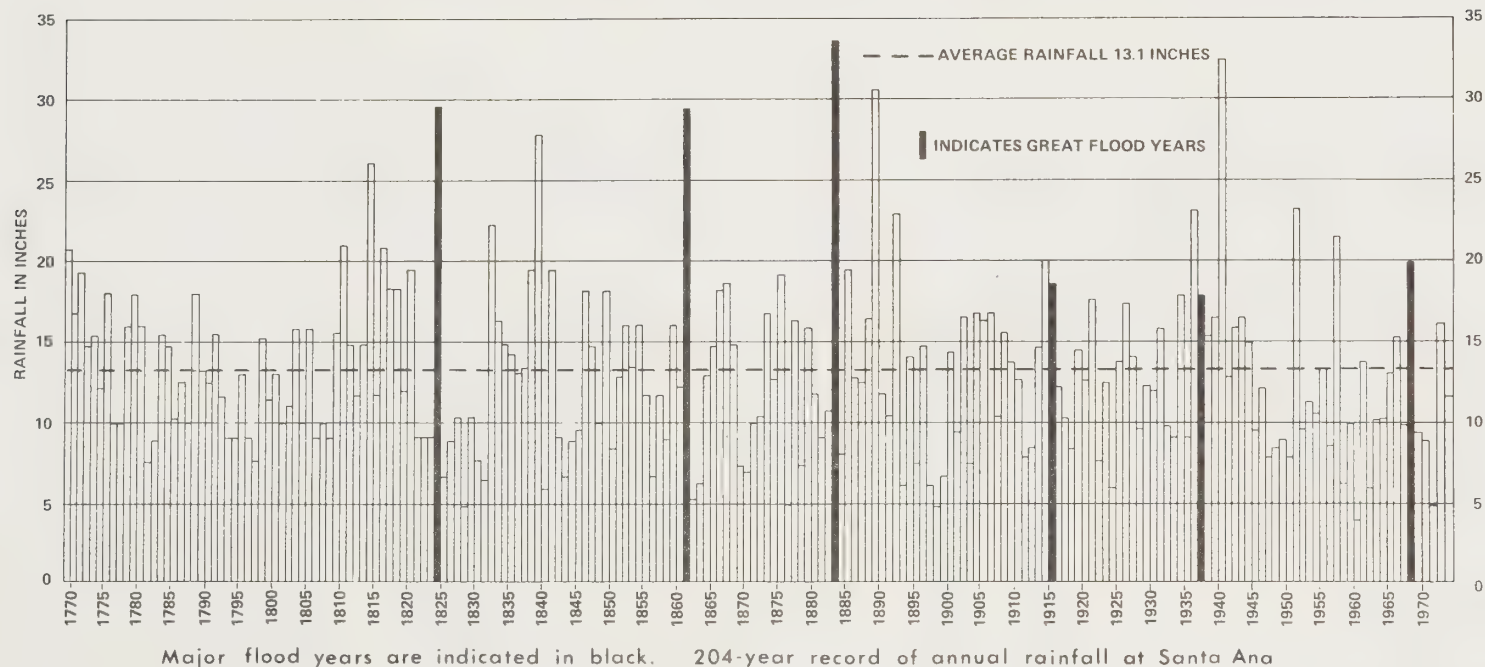
Additional legislation has empowered the district to utilize its works for recreation purposes, to acquire additional lands for environmental enhancement, to test and monitor the

FLOOD PLAIN ZONES



FIGURE 10

FLOOD YEARS AND YEARLY RAINFALL AT SANTA ANA SINCE 1769



The annual fluctuation of precipitation at Santa Ana for more than 200 years, since 1769, is shown in the above figure. Solid bars indicate years of the major floods in Orange County. It can be seen that most of the major flood years were also years of high total rainfall, but not all years of high rainfall were also flood years. A key factor that influences the occurrence of a flood is the distribution of the rainfall throughout the season.

TABLE 2

quality of water in its works and to purchase and reclaim water for beneficial use.

The district does not establish floodplain regulations, a function carried out by the county and the cities. Overflow areas on which floodplain regulations may be applied are, however, determined by the flood control district and by the Corps of Engineers.

Despite the expenditure of more than \$100,000,000 on structural flood protection works and the establishment and application of floodplain zoning ordinances in Orange County, there are still flood hazards, particularly from very large, intense and infrequently occurring storms. The most serious hazards are from Prado, Brea Creek and Fullerton dams, and the Santiago Creek floodplain. (See Technical Report, Chapter 6)

E. CRIME

The acknowledgement of crime protection needs and measures to meet such needs is especially relevant to the public safety aspect of this element.

Crime is a tremendously complex social phenomena. Analysis is beyond the scope of this element. Recognizing this limitation, the primary intent here is to acknowledge and identify the relationship of community and site design to crime so that it may be considered in future land development.

The minimal reference here should not be interpreted to mean crime prevention is a low priority item. Quite the contrary, it should be recognized as an area that needs and deserves increased recognition and study so that proper policies may be formulated and a course of action promulgated which will improve the safety of the residents of Orange County.

The following is an extract taken from "A Study

of Crime Prevention through Physical Planning
for the Southern California Association of
Governments" (September, 1971)

"The incidence of crime in both urban and rural areas has been rising at an alarming rate over the past several years. The majority of offenses committed are violent crimes against persons, such as murder, rape, robbery and assault. These crimes have increased alarmingly during 1973.

"One positive way to help make our environment secure and safe is to consider crime preventive measures in site planning and structural design.

"The lack of consideration for crime prevention measures in developments can be explained by the fact that no agency has been designated to establish crime prevention measures; techniques and guidelines have not been formulated; and developers and planners have not been required to consider the incorporation of crime prevention measures in their developments.

"Standards for defensible space* are being studied and developed by several groups and agencies across the nation."

The criminal justice planning division of the Southern California Association of Governments (SCAG) has developed a handbook of crime prevention bulletins to increase the consideration

* Defensible Space - The concept of urban space designed to inhibit crime by utilizing the propriety concerns of residents. Key ingredients in designing defensible space include: Improving the natural capability of residents to visually survey the public areas of their residential environment; enhancing spheres of territorial influence within which residents can easily adopt proprietary attitude; and enhancing safety through the strategic geographic location of intensively used community facilities. (General Plan Guidelines," California Council on Intergovernmental Relations, September, 1973)

of crime prevention possibilities in the physical planning processes and is currently engaged in a more detailed crime prevention study.

IV. RELATIONSHIP TO GENERAL PLAN ELEMENTS

Figure 11 illustrates the relationship between the Safety Element and the other seven state mandated elements.

LAND USE ELEMENT

The Safety Element has a stronger interface with the Land Use Element than with any other element of the Orange County General Plan. Policies of the Safety Element will provide for additional guidance in directing land use away from designated hazardous zones, or providing effective mitigating measures.

Significant portions of the Land Use Element will require reevaluation and amendment as a result of this element and its ongoing refinement.

CIRCULATION ELEMENT

Circulation includes those systems that move people, materials, goods, or services (e.g., water, sewer, jet fuel lines, petroleum products, energy, etc.) by any means.

Multiple hazards, evident throughout the county, will impact the Circulation Element by imposing design constraints on roadways, overpasses, and bridges. Some existing roadways and structures may need to be modified to meet new standards.

HOUSING ELEMENT

Policy decisions of the Safety Element reflect directly on the Land Use Element and in turn influence various aspects of housing. These policies will manifest themselves in design, location and/or placement of structures, construction codes, and certain safety feature requirements (e.g., automatic electrical cutoff, gas purging systems or fire warning devices). Modification of existing building and construction and grading codes may also be necessary.

OPEN SPACE AND CONSERVATION ELEMENTS

The Safety Element will interface in a positive manner with the Open Space and Conservation Elements. Implementation of these policies will increase the amount of open space available, its quality and accessibility.

NOISE ELEMENT

The Safety Element supports the reduction of noise levels in residential areas by providing policies concerning upgraded construction standards in hazardous areas.

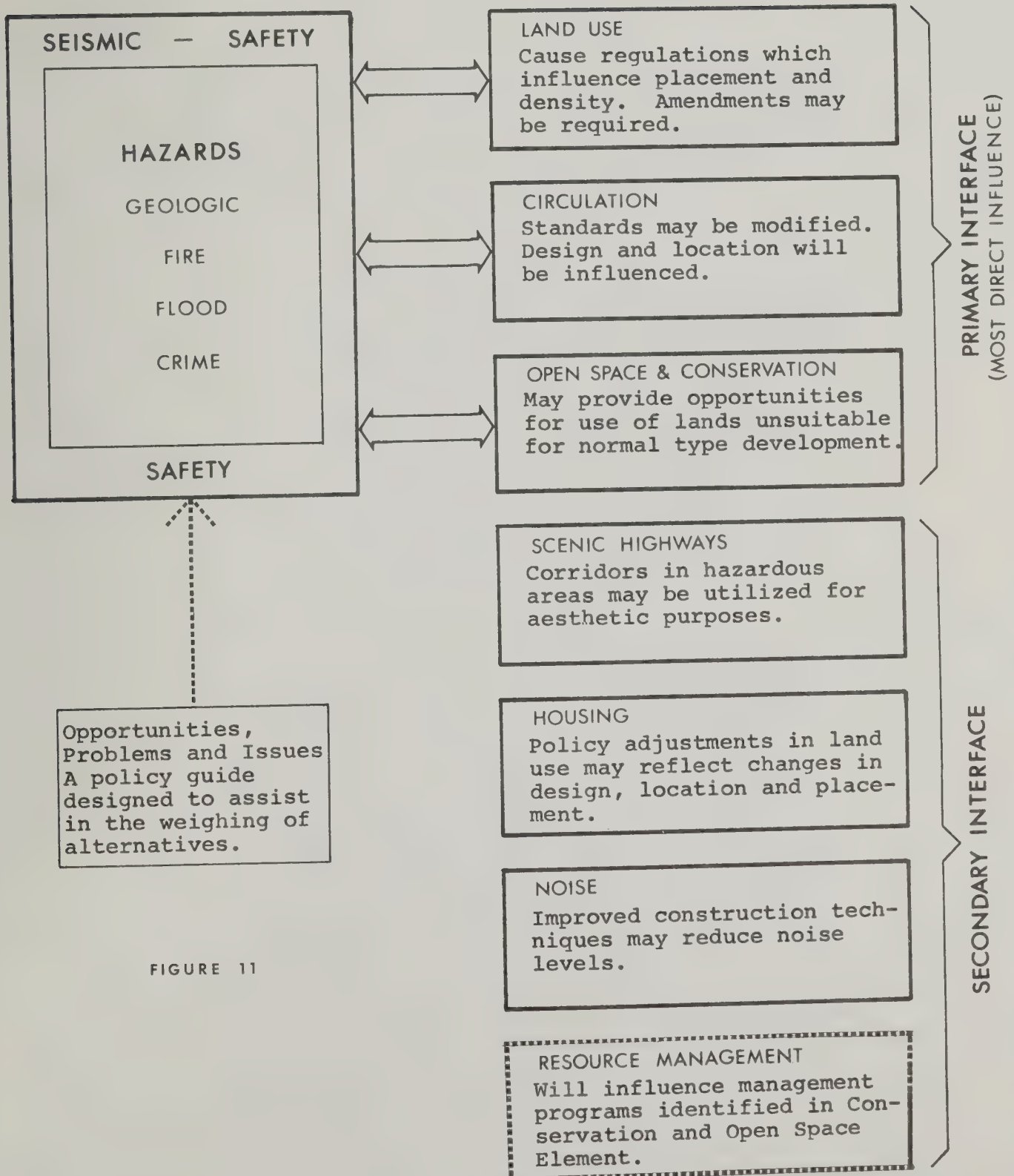
SCENIC HIGHWAYS ELEMENT

The Safety Element will delineate high hazard zones which may preclude normal development and may therefore offer increased opportunities for scenic highways. Although there is always the danger of a natural catastrophe in these zones, specific design criteria to mitigate the hazards can be included with the highway program.

Better access and water facilities help in the control of fires to maintain the aesthetic beauty of open space areas and in effect allow scenic areas to remain scenic. Moreover, implementation of Safety Element policies, enforcement of the Alquist-Priolo Geologic Hazards Zones Act, and expansion of the Scenic Highways Plan will provide accessibility to remote open space areas thereby utilizing the proximity of roads and fault zones for positive recreational impacts. The Whittier-Elsinore Fault is a good example of this type of potential.

SAFETY ELEMENT

INFLUENCE ON OTHER ELEMENTS



V. GOALS AND POLICIES

Safety Element goals reflect broad aims and basic values within Orange County and provide guides to establish the emphasis and tone of proposed actions.

SEISMIC AND GEOLOGICAL HAZARDS

GOALS:

- o To provide a safe living environment consistent with available resources required to identify and control natural seismic and geological hazards.
- o To mitigate potential disaster through land use and development standards designed to respect the tremendous forces of nature.
- o To provide information, training and disaster assistance for those times when nature foils our best efforts to control its destructive forces.

POLICIES:

1. Identify hazard areas and provide information to determine the relative risk to people and property in Orange County.
 - a. Map existing faults, slide areas, and other geologically unstable conditions.
 - b. Analyze existing seismic and geological data as it pertains to Orange County;
 - c. Establish development standards for land use and construction to ensure proper design and location of structures.
 - d. Illustrate the relative costs required to reduce the various levels of risk.
2. Create an on-going mechanism for developing and instituting controls to mitigate unacceptable risks.

- a. Establish design criteria for proposed improvements to existing construction and for new construction within seismic safety zones;
 - b. Establish seismic design criteria and standards for county linear system facilities, e.g., transmission lines, water and sewage systems, and highways;
 - c. Provide coordination to all agencies, within the county to assist in the mitigation of geologic and seismic hazards.
3. Actively promote public awareness programs and monitor the effectiveness of controls and their implementation.
 - a. Provide technical and policy information regarding geological and seismic hazards to developers, interested parties, and the general public.
 - b. Disseminate information regarding hazards and mitigating measures through all available media.
4. Support programs to investigate and understand the phenomena creating the hazard, train personnel in the effective technique of prevention and disaster control, and provide aid to persons affected by disasters.
 - a. Monitor and evaluate studies of earthquake damage to determine future regulations and programs;
 - b. Provide guidance during and after a geologic disaster and promote interagency assistance for persons affected;
 - c. Provide safe housing facilities for dependent populations (e.g., those in convalescent and nursing homes, correctional institutions, hospitals, sanitariums and private schools), by requiring special seismic design standards and construction criteria.

FIRE HAZARDS

GOALS:

- o To provide a safe living environment consistent with available resources required to identify and control structural and wildland fire hazards.
- o To mitigate potential disasters through land use and development standards controlling urban encroachment into natural areas, safety design features, and detection hardware.
- o To provide information, training and disaster assistance to assure preservation of natural resources and reduce personal and property losses due to unavoidable fires.

POLICIES:

1. Identify hazard areas and provide information to determine the relative risk to people and property in Orange County.
 - a. Map existing fire hazard areas.
 - b. Analyze existing fire hazard data as it pertains to Orange County.
 - c. Establish development standards for location, structural design and detection hardware.
 - d. Illustrate the relative costs required to reduce the various levels of risk.
2. Create an on-going mechanism for developing and instituting controls to mitigate unacceptable risks.
 - a. Establish design criteria for proposed improvements to existing construction and to new construction within fire hazard zones.
 - b. Improve Building Code regulations to provide increased built-in fire protection

for certain unusual fire protection problems.

- c. Participate in inter-agency automatic aid programs to maximize utilization of existing facilities.
 - d. Develop minimum water system design requirements for fire protection in wildland and remote areas.
 - e. Develop minimum urban development standards for emergency vehicular access.
3. Actively promote public awareness programs and monitor effectiveness of controls and their implementation.
- a. Provide technical and policy information regarding structural and wildland fire hazards to developers, interested parties and the general public.
 - b. Increase public awareness of fire department emergency capabilities with particular emphasis on prompt emergency notification.
 - c. Disseminate information regarding hazards and mitigating measures through all available media.
4. Support programs to investigate and understand the phenomena creating the hazard, train personnel in the effective technique of prevention and disaster control, and provide aid to persons affected by disasters.
- a. Recognize and consider state-of-the-art advancements in fire prevention and suppression.
 - b. Encourage evaluation of past rescue emergencies to determine the type of rescue service required of specific areas.
 - c. Encourage improvement of fire defense systems in hazardous areas and the upgrading of fire protection classifications.

- d. Promote improved inter-agency cooperation during major fires.
- e. Provide for public safety during and after wildland fires.

FLOOD HAZARDS

GOALS:

- o To provide a safe living environment consistent with available resources required to identify and control natural water related hazards such as inundation through flood or tidal action.
- o To mitigate potential disasters through land use and development standards controlling urban encroachment into flood plains.
- o To provide information, training and disaster assistance to assure the preservation of natural resources and reduce personal and property losses due to unusual storm conditions.

POLICIES:

1. Identify hazard areas and provide information to determine the relative risk to people and property in Orange County.
 - a. Identify by mapping flood-prone areas with respect to depth and frequency of flooding.
 - b. Establish development standards for land uses and construction to ensure proper design and location of public and private structures.
 - c. Illustrate the relative costs required to reduce the various levels of risk (this study does not presume to attach values to less tangible factors, such as loss of life and aesthetics, but attempts to illustrate hard costs with a list of the less tangible benefits).
2. Create an on-going mechanism for developing and instituting controls to mitigate unacceptable risks.

- a. Regulate designated major watercourses and/or development on their floodplains to provide safety during a standard projected flood.
 - b. Discourage building within flood plains and, when floodplain mapping is available, add flood plain regulations to existing zoning districts within flood plains.
 - c. Provide structural remedial projects to reduce frequency of flooding in developed areas to 100 years, as financial resources permit.
 - d. Prepare remedial measures to limit erosion and sediment transport from development areas to bays and harbors and to permit reasonable movement of sediment to the open ocean for beach sand replenishment.
3. Actively promote public awareness programs and monitor effectiveness of controls and their implementation.
 - a. Provide technical and policy information regarding flood hazards to developers, interested parties and the general public.
 - b. Disseminate information regarding hazards and mitigating measures through all available media.
4. Support programs to investigate and understand the phenomena creating the hazard, train personnel in the effective technique of prevention and disaster control, and provide aid to persons affected by disasters.
 - a. Monitor and evaluate studies of the use of non-structural alternatives, including more compatible land use planning adjacent to watercourses, for flood control purposes.
 - b. Provide guidance during and after flood disaster and promote interagency assistance for persons affected.

CRIME

GOALS:

- o To provide for a safe living environment consistent with available resources.
- o To mitigate the impact of crime through land use regulation, site planning, architectural design and security hardware.
- o To provide information, training and assistance to reduce loss of life and injury and to protect private and public property from the incidence of crime.

POLICIES:

1. Identify hazard areas and provide information to determine the relative risk to people and property in Orange County.
 - a. Determine those areas of investigation where land use regulation can most effectively reduce incidence of crime.
 - b. Establish standards for defensible site planning, architectural design and security hardware to deter crime.
 - c. Illustrate the relative costs required to reduce the various levels of risk.
2. Create an on-going mechanism for developing and instituting controls to mitigate unacceptable risks.
 - a. Develop programs which encourage introduction of crime prevention methods, techniques, and experience into the physical planning process.
 - b. Provide coordination to all agencies within the county to assist in the prevention of crime.

3. Actively promote public awareness programs and monitor effectiveness of controls and their implementation.
 - a. Support programs designed to improve public awareness of the relationship between crime prevention and physical planning.
 - b. Participate in programs designed to inform related professions and the general public of the relationships between crime prevention and physical planning.
4. Support programs to investigate and understand the phenomena creating the hazard, and train personnel in the effective technique of prevention control.
 - a. Encourage the development and analysis of defensible space concepts.
 - b. Monitor and evaluate studies of crime prevention through land use and development standards to determine future regulations and programs.

VI. PLAN IMPLEMENTATION PROGRAM

The General Plan sets forth broad implementation program guidelines to be followed by the organizations responsible. Immediate implementation of all Safety Element guidelines is unlikely due to the impact on numerous regulatory policies and activities of the county, its cities and other jurisdictions.

Recognizing that there are political, legal, time, resource, and other constraints, we have established a three phase implementation program to assist in setting a realistic framework for achieving our objectives. The three phases are designed to facilitate community feedback and adjustments in the program as more is learned about the exact nature of hazard conditions.

Central to the program is the establishment of a monitoring mechanism which would coordinate and guide the various implementation activities within the framework of policy guidelines and priorities established by the Board of Supervisors.

PHASE I is concerned with identification and analysis of hazards, the development of hazard controls, and the establishment of coordination among jurisdictions.

PHASE II proposes to strengthen inter and intra-agency coordination through the experience gained from monitoring Phase I, to refine Phase I programs relating to the identification of hazards, to upgrade existing ordinances, and to initiate new legislation.

PHASE III involves the assessment of the effectiveness of Phases I and II, the further refinement of ongoing programs and controls, and the initiation of new research into critical areas which lack information.

VII. RECOMMENDATIONS

1. The responsibility for implementing the Safety Element shall be with the Environmental Management Agency.
2. The Director of the Environmental Management Agency shall be responsible for developing a detailed work program consistent with the phasing indicated in the implementation section of this Element.
3. Said Work Program shall be submitted to the Board of Supervisors for consideration on its regular agenda within 60 days of approval of this Element.

APPENDIX A.

INCORPORATED BY REFERENCE

THE FOLLOWING COUNTY DOCUMENTS:

- o Emergency Services Plan
Department of Emergency Services
Revised March 15, 1973

- o Storm Manuel
Orange County Flood Control District
October, 1973

- o Technical Report
Department of Building and Safety
February, 1973

APPENDIX B.

ALQUIST-PRIOLO GEOLOGIC HAZARD ZONES ACT

§ 2621

PUBLIC RESOURCES CODE

CHAPTER 7.5 HAZARD ZONES [NEW]

Sec.

- 2621. Short title
- 2621.5 Purpose.
- 2622. Special studies zones, official maps and revisions to local and state agencies.
- 2623. Real estate developments and structures within zones; policies and criteria for approval.
- 2624. Local regulations.
- 2625. Building permits: fees.

Chapter 7.5 was added by Stats.1972, c. 1354, p. —, § 4.

Another Chapter 7.5, State Mining and Minerals Policy, comprising section 2650, was added by Stats.1972, c. 1225, p. —, § 3. See Chapter 7.5, post.

§ 2621. Short title

This chapter shall be known and may be cited as the Alquist-Priolo Geologic Hazard Zones Act.

(Added by Stats.1972, c. 1354, p. —, § 4.)

§ 2621.5 Purpose

It is the purpose of this chapter to provide for the adoption and administration of zoning laws, ordinances, rules, and regulations by cities and counties, as well as to implement such general plan as may be in effect in any city or county. The Legislature declares that the provisions of this chapter are intended to provide policies and criteria to assist cities, counties, and state agencies in the exercise of their responsibility to provide for the public safety in hazardous fault zones.

(Added by Stats.1972, c. 1354, p. —, § 4.)

§ 2622. Special studies zones; official maps and revisions to local and state agencies

In order to assist cities and counties in their planning, zoning, and building-regulation functions, the State Geologist shall delineate, by December 31, 1973, appropriately wide special studies zones to encompass all potentially and recently active traces of the San Andreas, Calaveras, Hayward, and San Jacinto Faults, and such other faults, or segments thereof, as he deems sufficiently active and well-defined as to constitute a potential hazard to structures from surface faulting or fault creep. Such special studies zones shall ordinarily be one-quarter mile or less in width, except in circumstances which may require the State Geologist to designate a wider zone.

Pursuant to this section, the State Geologist shall compile maps delineating the special studies zones and shall submit such maps to all affected cities, counties, and state agencies, not later than December 31, 1973, for review and comment. Concerned jurisdictions and agencies shall submit all such comments to the State Mining and Geology Board for review and consideration within 90 days. Within 90 days of such review, the State Geologist shall provide copies of the official maps to concerned state agencies and to each city or county having jurisdiction over lands lying within any such zone.

The State Geologist shall continually review new geologic and seismic data and shall revise the special studies zones or delineate additional special studies zones when warranted by new information. The State Geologist shall submit all such revisions to all affected cities, counties, and state agencies for their review and comment. Concerned jurisdictions and agencies shall submit all such comments to the State Mining and Geology Board for review and consideration within 30 days. Within 30 days of such review, the State Geologist shall provide copies of the revised official maps to concerned state agencies and to each city or county having jurisdiction over lands lying within any such zone.

(Added by Stats.1972, c. 1354, p. —, § 4.)

PUBLIC RESOURCES CODE

§ 2650

§ 2623. Real estate developments and structures within zones; policies and criteria for approval

Within the special studies zones delineated pursuant to Section 2622, the site of every proposed new real estate development or structure for human occupancy shall be approved by the city or county having jurisdiction over such lands in accordance with policies and criteria established by the State Mining and Geology Board and the findings of the State Geologist. Such policies and criteria shall be established by the State Mining and Geology Board not later than December 31, 1973. In the development of such policies and criteria, the State Mining and Geology Board shall seek the comment and advice of affected cities, counties, and state agencies. Cities and counties shall not approve the location of such a development or structure within a delineated special studies zone if an undue hazard would be created and approval may be withheld pending geologic and engineering studies to more adequately define the zone of hazard. If the city or county finds that no undue hazard exists, geologic and engineering studies may be waived, with approval of the State Geologist, and the location of the proposed development or structure may be approved.

(Added by Stats.1972, c. 1354, p. —, § 4.)

§ 2624. Local regulations

Nothing in this chapter is intended to prevent cities and counties from establishing policies and criteria which are stricter than those established by the State Mining and Geology Board, nor from imposing and collecting fees in addition to those required under this chapter.

(Added by Stats.1972, c. 1354, p. —, § 4.)

§ 2625. Building permits; fees

Each applicant for a building permit within a delineated special studies zone shall be charged a reasonable fee according to a fee schedule established by the State Mining and Geology Board. Such fees shall be set in an amount sufficient to meet, but not to exceed, the costs to state and local government of administering and complying with the provisions of this chapter. Such fee shall not exceed one-tenth of 1 percent of the total valuation of the proposed building construction for which the building permit is issued, as determined by the local building official. One-half of the proceeds of such fees shall be retained by the city or county having jurisdiction over the proposed development or structure for the purpose of implementing this chapter, and the remaining one-half of the proceeds shall be deposited in the General Fund.

(Added by Stats.1972, c. 1354, p. —, § 4.)

APPENDIX C.

GLOSSARY

An attempt has been made to define most of the technical words contained in the text. If a technical word is not defined, often the word can be found in a standard dictionary. In using the glossary, the reader will note that many technical words appear within the definitions themselves. Definitions of these words can also be found in the glossary.

Compaction - Decrease in volume of sediments, as a result of compression of sediments deposited above them or by mechanical means.

Differential Settlement - Loss of strength or the loss of water and sand through liquefaction often does not occur evenly over broad areas. Thus the ground settles different amounts in adjacent spots. Can be very destructive to buildings. Slow differential settlement can be caused by other factors such as differential compaction in sediments caused by different foundation loads or initial differences in density of unconsolidated sediments.

Earth-flow - A slow flow of earth lubricated with water. Earth-flows may be discriminated from earth-slumps by reason of their greater mobility.

Earthquake - Perceptible trembling to violent shaking of the ground, produced by sudden displacement of rocks below and at the earth's surface.

Epicenter - The geographical location of the point on the surface of the earth that is vertically above the earthquake focus.

Expansion - Increase in volume of clay and silt soils due to incorporation of water into the soil structure.

Fault - A fracture or zone of fractures in rock strata, and the movement that displaces the sides relative to one another.

Fault creep - Very slow periodic or episodic movement along a fault trace unaccompanied by quakes.

Fault system - Two or more fault sets formed at the same time.

Fault surface - The surface along which dislocation has taken place.

Fault trace - The intersection of a fault and the earth's surface as revealed by dislocation of fences, roads, by ridges and furrows in the ground, by dislocations in rock strata, etc.

Fault zone - A fault instead of being a single clean fracture, may be a zone hundreds or thousands of feet wide; the fault zone consists of numerous interlacing small faults or a confused zone of gouge, breccia or other material.

Fault, active - See "active fault"

Fault, inactive - See "inactive fault"

Fault, normal - See "normal fault"

Formation - A rock body or an assemblage of rocks which have some character in common; applied to a particular sequence of rocks formed during one epoch; a rock unit used in geologic mapping.

Geology - The science of the earth, the rocks of which it is composed, and the changes which it has undergone or is undergoing.

Ground cracking - Cracks usually occurring in stiff surface materials resulting from differential ground movement.

Ground failure - A situation in which the ground does not hold together such as in landsliding, mud flows, liquefaction and the like.

Ground lurching - Undulating waves in soft saturated ground that may or may not remain after the earthquake; non elastic deformations of plastic earth materials during earthquakes.

Ground response - The reaction of the ground to earthquake shaking.

Ground rupture - Cracking, and offset of the earth's surface along cracks.

Holocene - The period since the end of the last glaciation; usually defined as 11,000 years from the present.

Inactive faults - Identifiable faults which do not meet any of the criteria listed under "active faults."

Intrusion - An igneous rock that has been injected into older rocks; it has cooled and solidified from a molten condition under the cover of the surrounding rock mass.

Inundation - Flooding caused by water topping a dam or water released by dam, reservoir, levy or other break. Submersion.

Landsliding - The perceptible downward sliding or falling of a relatively dry mass of earth, rock, or mixture of the two. Often loosely used to also include sliding of wet earth masses such as mud-slides and earthflows.

Liquefaction - A process by which a water saturated sand lens loses coherence when shaken. Involved is the collapse of sand grains into intergranular voids which induces an increase in pore pressure and loss of strength. This loss of strength leads to a quicksand condition in which objects can either sink or float depending on their density. This loss of strength can also cause landsliding on low gradients.

Magnitude - The rating of a given earthquake is defined as the logarithm of the maximum amplitude on a seismogram written by an instrument of specified standard type at a distance of 62 miles from the epicenter. It is a measure of the energy released in an earthquake. The zero of the scale is fixed arbitrarily to fit the smallest recorded earthquakes. The scale is open ended but the largest known earthquake magnitudes are near 8-3/4. Because the scale is logarithmic, every upward step of one magnitude unit means a 32 fold increase in energy

release. Thus a magnitude 7 earthquake releases 32 times as much energy as a magnitude 6 earthquake. Magnitude is not the same as intensity.

Mudflow or mudslide - A flowage of heterogeneous debris lubricated with a large amount of water.

Normal fault - Vertical movement along a sloping fault surface in which the block above the fault has moved downward relative to the block below.

Peat - Partially decomposed mats of vegetable material found in marshy areas or former marshes with little or no soil between the organic material. Usually covered by sediments deposited in the marsh.

Pleistocene - The interval of glacial periods, usually defined as from 1 to 3 million years from the present to 11,000 years from the present.

Physiography - A description of existing nature as displayed in the surface arrangement of the globe, its features, atmospheric and oceanic currents, climate, etc.

Plastic deformation - Under some conditions solids may bend instead of shearing or breaking as a result of seismic and geologic forces.

Sediment - Solid material settled from suspension in a liquid or gas.

Seismic - Pertaining to an earthquake or earth vibration, including those that are artificially induced.

Seismology - The science of earthquakes and related phenomena.

Soil Collapse - Decrease in volume of soil due to a change in soil structure. This collapse is induced by loads placed on the soil which are greater than the rigidity of the soil combined with application of water consolidation.

Subsidence - Lowering of the elevation of an area or the earth's surface. This can be caused by forces deep within the earth (tectonic forces) or by consolidation or desiccation of sediments.

Trace, fault - See "fault trace"

Topography - The physical features of the land, especially its relief and contour.

Tsunami - A sea wave produced by large areal displacements of the ocean bottom, often the result of earthquakes or volcanic activity. Also known as seismic sea waves.

Unconsolidated material - Sediments which are susceptible to compaction by natural processes.

Undulating waves - Waves that rise and fall.

Uplift - Elevation of an area on the earth's surface caused by tectonic forces or by man's injection of fluids into sediments or rocks near the earth's surface.

Water Table - The upper surface of a zone of water saturation within the ground.

Wave height - The difference in elevation between adjoining wave crests and troughs.

APPENDIX D.

COUNTY OF ORANGE ENVIRONMENTAL MANAGEMENT AGENCY

☒ NEGATIVE DECLARATION

AND

☐ NOTICE OF DETERMINATION
(for projects receiving Negative Declarations)

☐ NEG. DEC. DENIED

PROJECT NO.: _____ DATE NEG. DEC. POSTED: _____

NEG. DEC. TO BECOME OFFICIAL, UNLESS APPEALED BY: _____

PROJECT #/TITLE/DESCRIPTION: Safety Element of Orange County General Plan for 1983

PROJECT LOCATION/ADDRESS: Orange County

LEAD DIV., DEPT., OR DIST.: EMA Contact Person: _____ Phone #: _____

NEGATIVE DECLARATION: In accordance with Orange County Board of Supervisors policies regarding implementation of the California Environmental Quality Act of 1970 (specifically Section 21151 of the Public Resources Code), the Environmental Management Agency has reviewed the Initial Study material prepared in regard to the above described project and hereby finds: (check one)

☐ That the proposed project may have a significant effect on the environment and has not been covered adequately in a previously approved Environmental Impact Report. Negative Declaration status therefore cannot be granted for this project and an Environmental Impact Report is thereby required to be prepared prior to the project's approval. The significant environmental impacts which may result from this project include -- but may not be limited to -- the following:

☒ That the proposed project cannot, or will not, have a significant effect on the environment. Negative Declaration Status is therefore granted for this project and the preparation of an Environmental Impact Report is thereby not necessary for the following reasons:

Due to the nature of the Element, no impacts on the environment can be discerned at this time. EIRs may be required for specific projects emanating from the Element, however the Element itself will have no significant impact on the environment.

☐ That even though the proposed project may have a significant effect on the environment, the project is a lesser included part of another project for which an Environmental Impact Report has previously been prepared, provided that the project and report submitted was approved and covers the specific environmental impacts of the lesser project. (In this case, the previous project and report should be noted): _____

☒ Negative Declaration Authorized

☐ Negative Declaration Denied

BY: [Signature] on _____ date _____
Authorized Signature

☒ NOTICE OF DETERMINATION: No Environmental Impact Report has been prepared on this project due to the above determination that there will be no significant adverse environmental effects resulting from the project. This project was APPROVED/DISAPPROVED (circle one) by the Orange County _____ on _____.

Notice of Determination
prepared by: _____
Authorized Signature

of: _____
Lead Dept., Div., Dist.

on: _____
date

Notice of Determination filed
with Clerk of the Board on:
(Clerk of the Board date stamp)

COUNTY OF ORANGE
ENVIRONMENTAL MANAGEMENT AGENCY
P.O. BOX 4048
SANTA ANA, CALIFORNIA 92702

INITIAL STUDY
for public projects

(REQUEST FOR NEGATIVE DECLARATION)

1. PROJECT TITLE: Safety Element for the Orange County General Plan
2. PROJECT LOCATION (including city and/or county jurisdiction): While the study is County-
wide in scope only the unincorporated areas will be directly affected. Indirect impacts
depend upon independent municipal district within the county.
 - 2.1 Please attach vicinity map and site plan that can be used as exhibits for Negative Declaration (8½ x 11 size is preferred.)
3. PROJECT DESCRIPTION (purpose, size, physical characteristics, funding, etc.): The purpose
of the Safety Element is to develop basic policy positions on urban development to reduce
adverse social and economic impacts from geologic disturbances, fire, flood and crime.
The Safety Element is county wide in scope and delineates hazard areas within the county
including those in unincorporated areas.
4. EXISTING SITE CONDITIONS (terrain, vegetation, wildlife, improvements; please include
photographs of site if available): Two major fault zones, extensive areas of high fire
hazard wildlands, extensive urban areas subject to structural fires, extensive land slides,
floodplains and three million people +X\$ property subject to crime.
5. SURROUNDING AREA (general description of area that may be affected) The safety element
deals directly with Orange County, however the safety of surrounding population may be
indirectly affected.
6. ANTICIPATED ENVIRONMENTAL IMPACTS UPON:
 - 6.1 Landform due to grading, excavation or dredging: The element is of a highly
general nature and has no discernible direct or indirect impacts on this facet of
the environment.
 - 6.2 Air Quality: "
 - 6.3 Noise Levels: "
 - 6.4 Vegetation & Wildlife: "
 - 6.5 Traffic: "
 - 6.6 Visual Quality: "

7. IS THE PROJECT LOCATED IN AN AREA EFFECTED BY (or to be effected by) HIGH NOISE LEVELS, such as airports, arterial highways, etc? Yes If so, please explain: The County contains areas of high noise levels; the general nature of the Element precludes any discernible impact on this facet of the environment.
8. IS THE PROJECT NEAR ANY LOCALLY OR REGIONALLY SIGNIFICANT NATURAL OR CULTURAL RESOURCE, such as a watercourse, hillside, or the beach? Yes If so, please explain: Due to the general nature of the Element, there will be no discernible impacts on this facet of the environment.
9. PLEASE INDICATE ALL OTHER AGENCIES, including other County government departments, which have jurisdiction over all or a portion of the project, will have to consider permits for the project, are involved in the project's funding, or are otherwise effected by the project: Independent municipal districts will determine the indirect impacts of this Element on their own jurisdictions.
- 9.1 Is the project within any city's sphere of influence? Yes If so which one? 26 incorporated cities.
10. DEPT./DIST./DIV. PROPOSING PROJECT: EMA
- 10.1 CONTACT PERSON: Robert Drennan
- 10.2 MAILING ADDRESS: Advance Planning Division, P.O. Box 4108, Santa Ana, Calif. 9270
- 10.3 PHONE: 834-4752
11. Initial Study prepared by: M.J. Bailey
- 11.1 Title: Jr. Planner
- 11.2 for (dept/dist.) EMA
- 11.3 on (date) February 11, 1975
12. ATTACHMENTS: None
13. OTHER COMMENTS: None

FOOTNOTES

¹Meeting the Earthquake Challenge, State of California, Joint Commission on Seismic Safety, Table I, page 9.

²Fire Damage Rating System, State of California, Ref. Cited Bibliography.

³International scale sea description and wave height from "Waves and Beaches" by Willard Bascom, Table II, pg. 48 and 49.

⁴See "Meeting the Earthquake Challenge," Final Report to the Legislature, State of California, by the Joint Committee on Seismic Safety, January, 1974.

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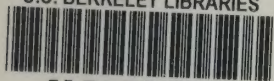
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